Approval: 6th Senate Meeting

Course Name: Fixed Income Securities
Course Number: MA-655

Credit: 2-1-0-3

Students intended for: MS/Ph.D.

Elective or Compulsory: Elective

Prerequisites: Knowledge of multivariable calculus, probability, statistics and stochastic process, differential equations and financial derivatives. Some knowledge of MATLAB/R/Spread sheets Packages.

Elective or Core: Elective

Semester: Even/Odd

Preamble: In expanding fixed income products market, the need to understand the securitized products with ever increasing complexity requires a firm understanding of mortgage-backed security market. Such an understanding is also needful in unravelling the causes of various financial disasters such as recent sub-prime crisis. Thus an introduction to causes of risk of fixed income securities, and the state of the art methodologies used by financial institutions to price and hedge fixed income products and derivatives is highly desired. This course strives to cover prevalent models and techniques necessary to examine fixed income instruments, and their derivatives.

Course objective:

This course is intended to provide a general idea of fixed income markets and securities. Students interested in opting careers in investment banking or management would found this course useful. This course will give practical information in addition to theoretical foundation regarding government securities, bonds, asset backed securities and ideas associated to investing in fixed income securities. Upon completion of the course, students should be able to understand the features of a variety of fixed income securities, and their derivatives, term structure model, various strategies and risk management.

Course Contents:

Introduction: Basic concepts of fixed income instruments and their analysis, bond prices and yield curves, duration and convexity, empirical methods to find yield curve. **2 L**

Pricing Theory and Models: Asset pricing theory and related topics such as arbitrage, risk-neutral probability measures, martingale measures, hedging, intermediate dividends, complete and incomplete market etc., Factor models Single factor and multi factor diffusion model and their calibration, HW, BDT, and HJM models etc. **16 L**

Credit derivatives and risk Management: Market models, interest rate risk management, defaultable bonds and credit derivatives, mortgages and mortgage-backed Securities. **10 L**

Text books:

1. Darrell Duffie, Kenneth J. Singleton, Credit Risk, Princeton University Press, 2003.
2. Sundaresan S., Fixed Income Markets and Their Derivatives, Academic Press, 3rd Ed., 2009.
3. Tuckman B. and Angel Serrat. Fixed Income Securities, John Wiley and Sons, 2011.

Reference Books:

1. Brigo D. and F. Mercurio, Interest Rate Models: Theory and Practice, 2nd edition, Springer Finance, 2006.
2. F. J. Fabozzi ,The Handbook of Fixed Income Securities, McGraw-Hill, 2005.
3. Jarrow R., Modeling Fixed Income Securities and Interest Rate Options, McGraw-Hill, 1996.
4. Paul Wilmott, Paul Wilmott on Quantitative Finance, John Wiley & Sons, 2000.